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Rhipicephalus (Boophilus) annulatus

Iowa State University Center for Food Security and Public Health

Rhipicephalus (Boophilus) annulatus

Cattle Tick,
Cattle Fever Tick,
American Cattle Tick

Last Updated: February 2007

Importance

Rhipicephalus annulatus (formerly *Boophilus annulatus*) is a hard tick found most often on cattle. Heavy tick burdens on animals can decrease production and damage hides. *R. annulatus* can also transmit babesiosis (caused by the protozoal parasites *Babesia bigemina* and *Babesia bovis*) and anaplasmosis (caused by *Anaplasma marginale*).

Babesiosis or "cattle fever" was eradicated from the United States between 1906 and 1943, by eliminating its vectors *R. annulatus* and *Rhipicephalus microplus.* Before its eradication, babesiosis cost the U.S. an estimated $130.5 million in direct and indirect annual losses; in current dollars, the equivalent would be $3 billion. *R. annulatus* and *R. microplus* still exist in Mexico, and a permanent quarantine zone is maintained along the Mexican border to prevent their reintroduction into the U.S. Within this zone, the USDA's Animal and Plant Health Inspection Service (APHIS) conducts a surveillance program to identify and treat animals infested with these exotic ticks. Recently, increased numbers of infestations have been recorded in the quarantine zone.

Species Affected

Cattle are the preferred hosts for *R. annulatus*. This tick species is also found occasionally on other large animals including horses, deer and some ungulates exotic to the U.S., as well as on capybaras in South America. It rarely feeds on sheep and goats. *R. annulatus* has been found attached to humans and dogs, but neither is thought to be a suitable maintenance host.

Geographic Distribution

R. annulatus is found in subtropical and tropical regions. This tick is endemic in parts of Africa, the southern regions of the former U.S.S.R., the Middle East, the Near East, the Mediterranean, and parts of South America and Mexico. It has been eradicated from the U.S., but can be sometimes found in Texas or California, in a buffer quarantine zone along the Mexican border.

Life Cycle

R. annulatus is a one-host tick; all stages are spent on one animal. The eggs hatch in the environment and the larvae crawl up grass or other plants to find a host. They may also be blown by the wind. In the summer, *R. annulatus* ticks can survive for as long as 3-4 months without feeding. In cooler temperatures, they may live without food for up to six months. Ticks that do not find a host eventually die of starvation.

Newly attached seed ticks (larvae) are usually found on the softer skin inside the thigh, flanks and forelegs. They may also be seen on the abdomen and brisket. After feeding, the larvae molt twice, to become nymphs and then adults. Each developmental stage (larva, nymph and adult) feeds only once, but the feeding takes places over several days. Adult male ticks become sexually mature after feeding, and mate with feeding females. An adult female tick that has fed and mated detaches from the host and deposits a single batch of many eggs in the environment. Typically, these eggs are placed in crevices or debris, or under stones. The female tick dies after ovipositing. Ticks in the subgenus *Boophilus* have a life cycle than can be completed in 3-4 weeks; this characteristic can result in a heavy tick burden on animals.

Identification

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Rhipicephalus annulatus is a member of the family Ixodidae (hard ticks). This tick was formerly known as *Boophilus annulatus*; however, *Boophilus* has recently become a subgenus of the genus *Rhipicephalus*.

Hard ticks have a dorsal shield (scutum) and their mouthparts (capitulum) protrude forward when they are seen from above. *Boophilus* ticks have a hexagonal basis capitulum. The spiracular plate is rounded or oval and the palps are very short, compressed, and ridged dorsally and laterally. Males have adanal shields and accessory shields. The anal groove is absent or indistinct in females, and faint in males. There are no festoons or ornamentation.

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Recommended actions if *Rhipicephalus annulatus* is suspected

Notification of authorities

Suspected or known *R. annulatus* infestations should be reported immediately to state or federal authorities.

Federal: Area Veterinarians in Charge (AVIC):
www.aphis.usda.gov/animal_health/area_offices/

State Veterinarians:
www.usaha.org/Portals/6/StateAnimalHealthOfficials.pdf

Control

In the U.S., *R. annulatus* and *R. microplus* incursions are controlled by USDA APHIS Fever Tick Eradication Program personnel, including mounted inspectors called "tick riders." Tick riders patrol the Rio Grande river, inspect ranches in the quarantine zone, and apprehend stray and smuggled livestock from Mexico. Before being moved from the quarantine zone, cattle and horses must be inspected and given a precautionary treatment with acaricides.

Farms and ranches with *R. annulatus* infestations are placed under quarantine for 6 to 9 months, depending on the time of the year. A single acaricide treatment can destroy all of the ticks on an animal, but will not prevent reinfestation. There are two options for treating infested and exposed cattle. These animals may be dipped at regular intervals for 9 months. Alternatively, they may be treated until they are "tick free" before two consecutive acaricide treatments, then removed from the infected pasture. The infested pasture must remain free of all livestock for 6-9 months or longer, to break the tick life cycle. Deer and exotic ungulates may maintain the ticks on vacated pastures; ivermectin-based feed and pesticide treatment protocols have been established to treat wild animals visiting the field. *R. annulatus* can become resistant to acaricides.

Public Health

R. annulatus can transmit babesiosis to susceptible (usually splenectomized) humans.

Internet Resources

Acarology WWW Home Page
http://www.nhm.ac.uk/hosted_sites/acarology/

Food and Agriculture Organization of the United Nations (FAO). Ticks and Tick-borne Diseases.
http://www.fao.org/WAICENT/faoInfo/Agricult/AGA/AGAH/PD/pages/DEFAULT.HTM

The Merck Veterinary Manual
http://www.merckvetmanual.com/mvm/index.jsp

The University of Edinburgh. The Tick Collection.
http://www.nhc.ed.ac.uk/index.php?page=24.25.121

Tick Identification Key
http://webpages.lincoln.ac.uk/fruedisueli/FR-webpages/parasitology/Ticks/TIK/tick-key/index.htm

United States Animal Health Association. Foreign Animal Diseases
http://www.aphis.usda.gov/emergency_response/downloads/nahems/fad.pdf

United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS)
http://www.aphis.usda.gov

World Organization for Animal Health (OIE)
http://www.oie.int

OIE Terrestrial Animal Health Code
http://www.oie.int/international-standard-setting/terrestrial-code/access-online/

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* Link defunct as of 2007

** Link defunct as of 2012